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ABSTRACT

This teaching unit, Ecology Workers, is one in a series of career guides developed by Project CHOICE (Children Have Options in Career Education) to provide the classroom teacher with a source of career-related activities linking third and fourth grade elementary classroom experiences with the world of work. Part of the Agriculture and Ecological Occupations Career Cluster, these eight lessons on ecology workers explore specific jobs, tools and equipment used and discuss the needs and problems of energy, resources and pollution in relation to ecology. An introductory section gives the unit rationale, goals, performance objectives, entry-level assessment, and evaluation. A list of instructional materials, such as films, filmstrips, books, art supplies, and community resources, is included in this section. Each lesson contains a statement of purpose, materials needed for the lesson, an introductory statement, class activities, and a summary activity. Written materials (such as worksheets, surveys, and task cards) are included where feasible. (This guide is one of twenty-four in the series for grades 3 and 4--CE 025 766-789.) (MEK)

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OFFICE OF CLAUDE W. RICHARDSON
KERN COUNTY SUPERINTENDENT OF SCHOOLS

Project CHOICE
#100

A CAREER UNIT FOR GRADES 3 AND 4

ECOLOGY WORKERS

(Agriculture and Ecological Studies Occupations Career Cluster)

2

December, 1977

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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FOREWORD

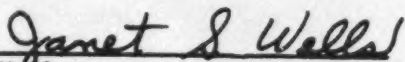
Project CHOICE: Children Have Options in Career Education, is an Exemplary Project from the San Diego City School District, which has been adapted, with ESEA Title IV-C funding, for Kern County Schools.

Through Project CHOICE, units have been developed to provide the classroom teacher with a source of career-related activities linking classroom experiences with the world of work. All students, regardless of their post-high school plans, share an equal need for career awareness, decision making skills, and other elements of career education. This goal can be accomplished if all teachers and counselors "fit" the appropriate units where they best apply in the curriculum.

We are indebted to the San Diego City School District, and the Project CHOICE staff, for developing and field testing the original units.

For their excellent work in re-writing the units in order to adapt them for use in Kern County Schools, we wish to recognize:

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Agriculture and Ecological Studies Occupations
Career Cluster

ECOLOGY WORKERS

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Agriculture and Ecological Studies Occupations
Career Cluster

ECOLOGY WORKERS

TEACHERS' GUIDE

The aim of this unit is to introduce to the students the many career opportunities available in the field of ecology. It is hoped that through this unit interest in a specific field of ecology may be developed and the activities will help students gain a growing awareness of the need for ecology in everyday lives as well as the need for environmental protection in order to maintain a healthy living situation.

RATIONALE

Children are aware of ecology and environmental concerns. In this unit they will study the jobs and tools used by ecology workers. The children will also become aware of the urgent needs and problems of energy, resources, pollution, as they effect their lives.

GOALS

Through this unit, students will:

- Learn about the many fields of interest in ecology.
- Become aware of the different career opportunities in each ecological field.
- Learn about specific jobs, tools, equipment that ecology workers need and use.
- Learn about the special skills ecology workers need.
- Become aware of the importance of ecology workers and the future of the world.

PERFORMANCE OBJECTIVES

By the end of this unit, the students will be able to:

- Name four or more fields of work in ecology.
- Identify four or more occupations from description of the work done.
- Define four or more workers from their name. What is a forest ranger, political scientist, botanist, accoustical engineer?
- State the basic educational needs of an ecology worker.

- Identify some tools and equipment that ecology workers use.
- Identify four or more types of jobs ecology workers perform.
- Describe how different ecology workers work to make the world a better place.
- Tell why ecology workers are important.

ENTRY LEVEL ASSESSMENT

(To be used as a pre-test and a post test.)

Use this informal inventory about ecology workers to determine the class awareness of careers in ecology. What the occupations are, what the job descriptions are and why they are important. Responses may be taped or written.

1. Name some different careers in ecology.
2. Who works to clean our air?
What is done about noise pollution?
What is done to preserve our resources?
What is done to avoid waste?
Who takes care of the wildlife?
3. Name some special tools, equipment and materials that ecology workers use.
4. Name some problems that ecology workers face.
5. Describe the jobs ecology workers perform.
6. Tell how much education ecology workers need.
7. Name some skills ecology workers need.
8. Tell how ecology workers make our lives better.

EVALUATION

The final lesson has been set aside for evaluation. The Entry Level Assessment may be used as a pretest as well as a post test, or the teacher may wish to develop his/her own. Responses may be taped or written, so that comparisons may be made in order to determine how well pupils have achieved the objectives.

SUGGESTED INSTRUCTIONAL MATERIALS

The following materials and equipment may be used in this unit:

- Films, filmstrips, soundstrips, transparencies, study prints as listed.
- Books as listed.
- Film, filmstrip projector, overhead projector.
- Record player.
- Variety of art materials.
- Permission slips.
- Task cards.

Films:

Our Part in Conservation
World is a Bank
Land Pollution: A First Film
Preserving Our American Wilderness
Recycling Our Resources

Books:

<u>Title</u>	<u>Author</u>
If I Built a Village	Mizumura
A Clearing in the Forest	Carrick

Additional Resources:

Dept. of Fish and Game, State of Calif.
1416 - 9th Street
Sacramento, CA 95814
Teacher's packet on ecology of California

Environmental Education
State of Calif., Dept. of Education
721 Capitol Mall
Sacramento, CA 95814
Teacher's packet and curriculum guide

Environmental Education Branch
Forest Service
U. S. Dept. of Agriculture
Washington, D.C. 20250
Investigating Your Environment and teaching materials

McDonald's
P. O. Box 2344
Kettering, Ohio 45429
Ecology Action Pack

AVAILABLE IN INSTRUCTIONAL RESOURCES CENTER: OFFICE OF THE KERN
COUNTY SUPERINTENDENT OF SCHOOLS
(Please preview first, to be certain of suitability for specific
students and situations.)

Films: MP 601 Lakes: Aging and Pollution
MP 1822 Tide Pool Marine Life
MP 4850 Balance in Nature
MP 5526 Atonement: Part I
MP 5525 Atonement: Part II
MP 5481 What Ecologists Do
MP 589 Conservation - A Job For Young Americans
MP 591 Buttercup
MP 5905 Desert and Man
MP 608 Discovering the Forest
MP 4918 Conserving Our Water Resources Today
MP 1842 Working Water

Publications:

Nature's Classroom, published by Los Angeles County Superintendent
of Schools for Sixth Grade Camp
K.E.E.P. materials, published by Kern County Superintendent of
Schools for Sixth Grade Camp

COMMUNITY RESOURCES

Edmonston Pumping Plant; Water Resources Department; contact by
phone - 858-2368

Teacher Background Information

ECOLOGY WORKERS

agriculturist	botanist
forest ecologist	horticulturalist
astronomer	chemist
assayer	mineralogist
physicist	seismologist
soil scientist	anthropologist
economist	geographer
mathematician	statistician
refuse collector	resource developer
power-plant operator	recycling operator
sewer systems supervisor	water treatment plant operator or supervisor

OTHER ECOLOGY JOBS

aeronautical engineer	agricultural engineer
chemical engineer	combustion engineer
electrical engineer	civil engineer
hydraulic engineer	geological engineer
industrial engineer	mechanical engineer
mining engineer	nuclear engineer
field health officer	park ranger
architect	landscape architect
fish and game warden	forester
range manager	watershed manager
wildlife manager	biochemist
biophysicist	biostatistician
cytologist (study of cells)	geneticist (study of heredity)

microbiologist

bacteriologist

pathologist

animal ecologist

animal husbandry

pharmacologist

zoologist

Meteorologist:

Studies changes in the earth's atmosphere. Weather is a key job of a meteorologist. Air pollution is a basic problem studied by a meteorologist.

Requirements: 4 years of college and at least one year of graduate school.

Oceanographer:

Examines the ocean, its contents and movements. Looks for new ways to solve environmental problems connected with the ocean.

Sociologist:

Studies people and groups of people. Looks at organizations and the environment in which they live.

Requirements: 5 - 7 years of college including graduate school.

Writer:

Informs citizens about ecology and how it effects their daily lives. Looks for solution to ecology problems.

Lawyer:

Studies and helps create laws to protect the environment.

Requirements: 7 years of college including law school.

Physiologist:

Studies animals, organs, tissues and cells. Studies the processes as they relate to environmental problems.

Requirements: 10 years of study including college and medical school.

Geologist:

Studies the earth's crust, its structure and composition. The geologist is a key to an understanding of the use of the environment. They look for energy sources such as oil and natural gas.

Requirements: 4 - 7 years of college and graduate school.

Toxicologist:

Looks for poisonous substances in environmental areas.

Requirements: 5 - 7 years of college and graduate school.

Urban Planner:

Examines urban problems, works with agencies to prevent and solve urban connected problems. Checks the needs of the city as related to the environment.

Soil Conservationist:

Works with farmers and other interested groups in the management, use and care of soil. Works closely with environmental problems related to land use.

Requirements: 4 years of college.

Aquatic Biologist:

Studies the plant and animal life underwater. Interested in maintaining the balance of life underwater.

Requirements: 5-7 years of study including college and graduate school.

Entomologist:

Studies insects and how they effect other forms of life. Specializes in insects that carry disease or spoiled food.

Requirements: 5-7 years of college including graduate school.

Teacher:

Prepares and educates individuals on the problems and responsibilities of the environment. Creates environmental awareness and motivates individuals to work on solving these problems.

Requirements: 4 years of college.

Environmental Engineer:

Uses the learnings of engineering to provide methods and ways to solve the problems of ecology. Covers all areas of air, water, noise, health, social and economics.

Requirements: 4 or more years of college.

Physician:

Cares for and treats individuals who suffer ill effects of an unhealthy environment. He not only works with diseases, but also checks safety and the effects on health of environmental pollutants.

Requirements: 8 years of study including college, medical school, and internship.

Sanitarian:

Manages programs and responsibilities related to sanitation. Checks health standards to prevent outbreaks of illness. Enforces laws regarding handling and preparing of food for public use.

Requirements: 4 years of college.

Solid Waste Systems Supervisor:

Supervises solid-waste collection, processing and disposal systems.

Requirements: 1 or 2 years of technical or vocational training.

Environmental Inspector:

Checks and records environmental purity of air, smoke and water and waste by using mechanical and chemical tests. Check data and notifies the agency which is responsible for verifying that environmental standards are met.

Requirements: 2-3 years of technical school or college.

Nuclear Technician:

Test nuclear waste disposal methods. Reports and assists in the development of machines and equipment. Work at nuclear power plants in the detection of radiation. Use of complex laboratory equipment.

Requirements: At least 2 or 3 years of technical school or college.

Mechanical Tester:

Checks air and noise pollution caused by engines. Monitors fuels and lubricants in engines and analyzes engine exhausts.

Requirements: 2 - 3 years of technical school or college.

Incinerator Plant Attendant:

Job responsibilities are to arrange for waste disposal in such a way as to minimize air pollution. Operates an incinerator, manages unloading solid waste trucks. Fixes and maintains machines. Requirements: High school education and on-the-job training.

Wildlife Attendant:

Works and operates fish hatcheries, refuge parks and animal conservation areas. Watches animal development including breeding counts, and the study of fish, insects, birds and other animals in their natural habitats.

Requirements: High school education and on-the-job training.

Wastewater Treatment Plant Operator:

Operate jobs that concern the effective recycling of water and the removal and disposition of solid wastes. Works with specialized water pollution control equipment, i.e., take readings, recordings and samples of wastewater.

Requirements: High school education and on-the-job training.

Sanitary Landfill Equipment Operator:

Drive a gasoline or diesel powered tractor, power shovel or other heavy equipment for the maintenance of a sanitary land fill.

Requirements: Some high school education and on-the-job training.

INSTRUCTIONAL STRATEGY: LESSONS 1 - 8

Lesson 1

PURPOSE

To learn the meaning of ecology as it effects our daily lives - and as a field containing many career opportunities. The need for careers aimed at helping solve the ecology problems will also be explored.

MATERIALS

1. Entry Level Assessment.
2. Chart paper or tape recorder.
3. Film or filmstrip about pollution. (See list of films available at Instructional Resources Center: Office of the Kern County Superintendent of Schools.)
4. Film or filmstrip projector.
5. Task cards 1 through 5.

INTRODUCTION

Say: "Today we are going to discuss ecology, what it is and where it is. Let's list or tape all the things we know about ecology."

Suggested ideas for discussion:

pollution of air, pollution of water, energy crisis, resources, wild-life, noise pollution, ocean pollution.

CLASS ACTIVITIES

1. Entry Level Assessment
2. View film, if available.
3. Discuss film and problems in ecology.
4. Say: "What jobs can you think of that are needed to work in areas of ecology?"

SUMMARY

Review list of problems in ecology in the world.
Review list of suggested jobs to work on problems.

Lesson 2

PURPOSE

To learn of the need for, and significance of, workers who help control air and land pollution.

MATERIALS

1. Chart paper or butcher paper for charts.
2. Marking pens.
3. Books and magazines about pollution, checked out from the school or public library.
4. Newspapers, for cutting.
5. Task cards 6 - 9.

INTRODUCTION

Say: "Air and land pollution is something we all know about. Today let's explore some of the effects of this pollution and some things that can be done about it."

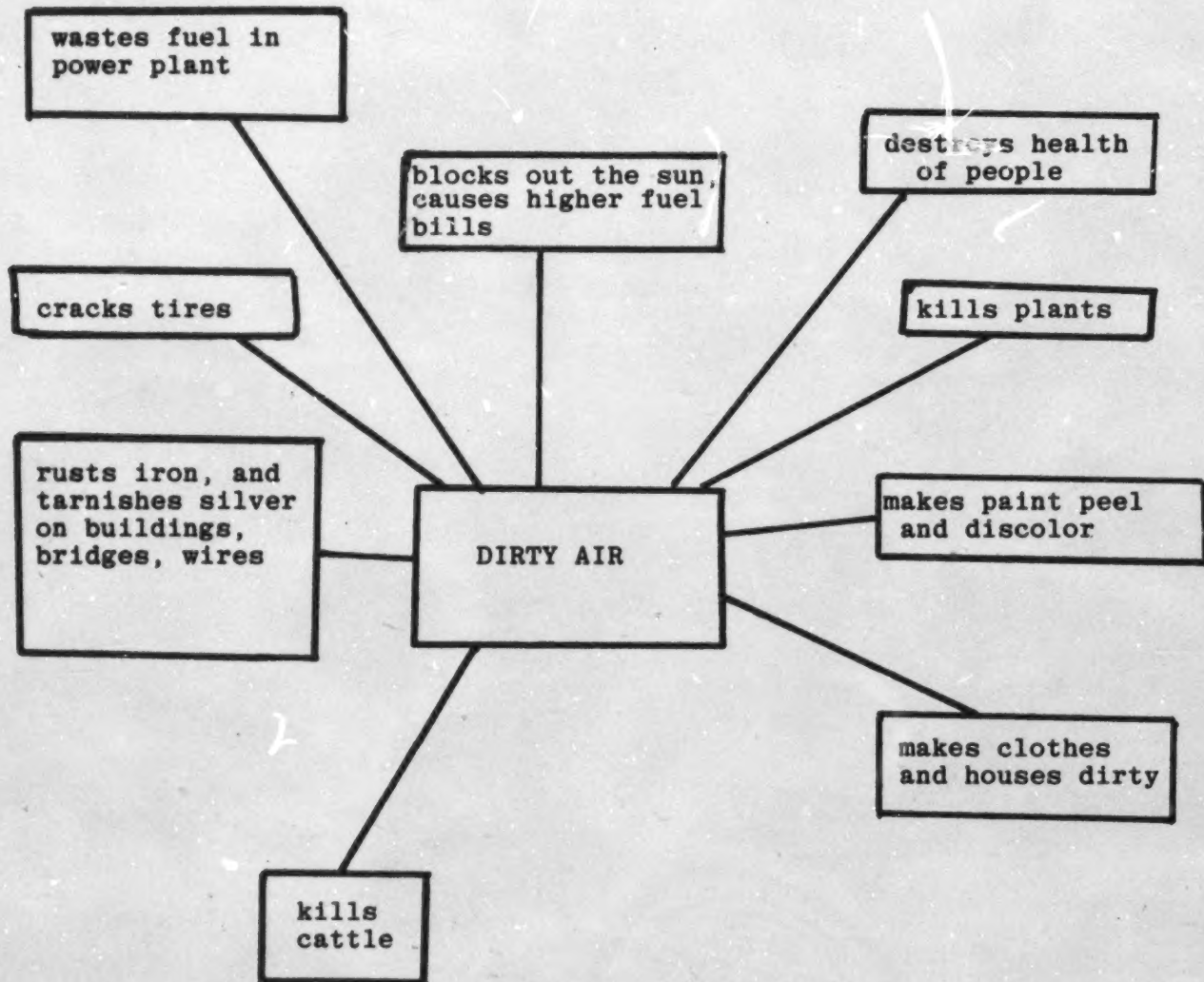
CLASS ACTIVITIES

1. Students diagram large charts, such as the one on the following page, to show the effects of air and land pollution.
2. Students read books and magazines to try to find what is being done about these pollution problems.
3. Students cut out newspaper clippings about pollution and pollution control, and use to make a bulletin board display.
4. Do task cards.

SUMMARY

Discuss the various jobs that help control land and air pollution.

EFFECTS OF AIR POLLUTION



Lesson 3

PURPOSE

To learn of the work in waste water technology and the significance of these jobs in our daily lives.

MATERIALS

1. Guest speaker - contact Water Resources Dept., Edmonston Pumping Plant, 858-2368.
2. List of questions, prepared by students.
3. Task cards 10 through 15.

INTRODUCTION

Say: "Today we have a visitor from the Water Resources Department. As we listen, keep in mind the jobs and skills needed to provide clean water for our community."

CLASS ACTIVITIES

1. Listen to speaker.
2. Take notes.
3. Discuss answers to questions prepared by students.

SUMMARY

Make a chart of the various jobs in controlling clean water.

Lesson 4

PURPOSE

To learn of the work related to the fight against noise pollution: transportation operators, engineers and related personnel, highway and aeronautics, land use controllers, industrial engineers, medical people and political scientists (government.)

MATERIALS

1. Paper; pencils.
2. The term 'noise abatement' written on the board.
3. Task cards 16 through 22.

INTRODUCTION

Say: "Let's all use just one of our senses--hearing. Let's close our eyes and listen very carefully." Children should be encouraged to listen very carefully, after a period of time have children record the noises and source of noises. Discuss with the class the various sources of noise in the community. Write noise abatement on board. Then say: "What does noise abatement mean? Let's check the dictionary. What areas are concerned with noise abatement?" (Air traffic, highway control, street, community, industry) "What is noise? Noise is any unwanted sound. What can excessive noise do?" (Damage to ears, loss of hearing, unpleasant living and working conditions.) "How do we measure sound?" Decibels, 0-140, 140 decibels causing pain.

CLASS ACTIVITIES

1. Class discussion:
Find out how many careers in ecology children associate with noise pollution, list on board. Discuss work locations (fighting noise, i.e. industry, airport, architect's office, community, environment, highways, hospitals, etc.)
Make a list of skills and tools needed.*
Discuss education and training needed.*
Make a chart of as many careers as the class is interested in or aware of. Discuss the importance of the jobs, the variety of careers.
2. Task cards.
3. Assign children to write a story about the career in anti-noise ecology they might choose. Have children include skills they will need to develop.

SUMMARY

1. Individual children make reports to class on activities they've worked on.
2. Review major concepts about careers in noise pollution.

* Use the Teacher Background information sheets, the Occupational Outlook Handbook, and other career materials in the library.

Lesson 5

PURPOSE

To become familiar with the work related to the conservation of wildlife. Forest rangers, botanists, tree surgeons, veterinarians, political scientists are just a few careers that play an active role in conservation of wildlife.

MATERIALS

1. Films and filmstrips about preserving our American wilderness and conservation of wildlife. (See suggested films available from Instructional Resources Center, Kern County Superintendent of Schools Office.)
2. Film or filmstrip projector.
3. Task cards 23 - 28.
4. Optional: If possible, contact the U.S. Forest Service about a speaker. (See list of questions, next page.)

INTRODUCTION

Say: "Boys and girls, today we are going to take a journey. For our trip we will need a very special vehicle - a time machine. So let's all use our imagination to create our time machine and let's go back in time. Let's go back 200 years. What do we see?" Discuss with students various areas of U.S. - what they see, animals, vegetation, wilderness. Proceed with children to various places and times. Say: "Let's go ahead. What has happened to forest wilderness, animals, etc.?" Discuss problems, solutions, what careers, jobs must be done to solve problems that man and time have created.

CLASS ACTIVITIES

1. View films or filmstrips.
2. Task cards.
3. Field trip on pretend time machine.
4. Optional: Speaker from Forest Service.

SUMMARY

1. Discuss film and field trip.
2. Reports from groups using task cards.

Questions for Ranger

1. What careers, jobs do you consider essential for wildlife protection?
2. What preparations, learning and experiences are necessary for careers in wildlife protection?
3. What are the future needs for personnel in wildlife protection?
4. What kind of future will we have if we ignore the present problems?
5. Why is it important to set aside lands, areas as state parks?
6. Do we have enough land set aside?
7. What workers are necessary to maintain our parks?
8. Who takes care of sick plants and trees?
9. Who cares for animals that are diseased?
10. How many workers are connected with fire protection?

Lesson 6

It is suggested that this lesson may be expanded to cover more lessons, by using all or part of Unit #103, Oceanographer.

PURPOSE

To become familiar with oceanography and the scientists, careers and the tools of ecology.

MATERIALS

1. Film or filmstrip about the ocean and tide pools. (See suggested films available from Instructional Resources Center, Kern County Superintendent of Schools Office.)
2. Film or filmstrip projector.
3. Globe.
4. Task cards 30 through 33.

INTRODUCTION

Say: "How much of the world is covered by the oceans? (Look at a globe.) How does the ocean effect our lives? What have you heard in the news recently about the ocean? (Discuss.)

CLASS ACTIVITIES

1. View film and/or filmstrips.
2. Discuss ocean and tidepool life, as suggested by the film and/or filmstrips.
3. Discuss the work of oceanographers.*
4. Do task cards.

SUMMARY

1. Review the general discussion concepts.
2. Reports from people doing task cards.

* The teacher may find information in the Occupational Outlook Handbook, available in the public library.

Lesson 7

PURPOSE

To look for the future problems of ecology and the careers needed to solve these problems.

MATERIALS

1. Ditto master of Worker Wheel of the Future, page 18.

INTRODUCTION

Say: "We have seen, discussed, and visited many areas involved in ecology and ecology control. Today's question will be: What is our best bet for a cleaner world in the future? How can we protect the standard of living we enjoy today from pollution? We must take the same skills, tools, energies that have brought us to our present living condition and use them to solve the problems of pollution and ecology. Look at our future workers' wheel and see where the answers will be found and what careers will be needed to find the answers. Do you see yourself somewhere on the worker wheel?"

Use the wheel for class discussion. Have students identify specific occupations, skills and ecology problems related to the occupations. Discuss school skills that are important in these occupations.

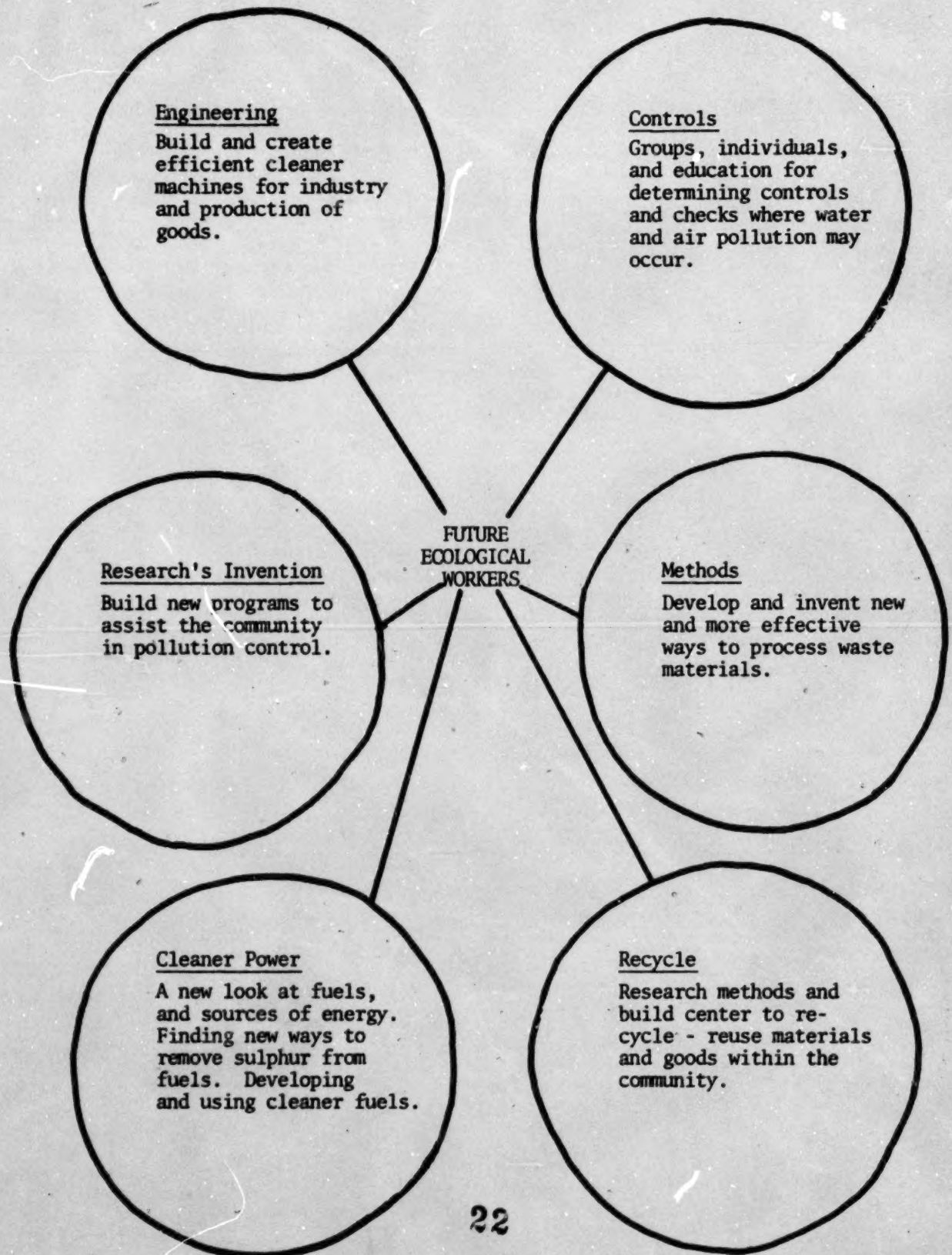
CLASS ACTIVITIES

1. Children may select one part of the wheel and prepare a report to the class on a specific job. They may write a report and illustrate with a picture. They may do a committee report using resource materials, library, newspaper. They may act out a particular occupation. They may make a diorama.

SUMMARY

1. Review worker wheel and class activity projects.

FUTURE WORKER WHEEL



Lesson 8

PURPOSE

To enable students to assess their knowledge of the careers in ecology studied in this unit.

MATERIALS

1. Tape recorder.
2. Tape from pre-test.
3. Entry Level Assessment.
4. All task cards.

INTRODUCTION

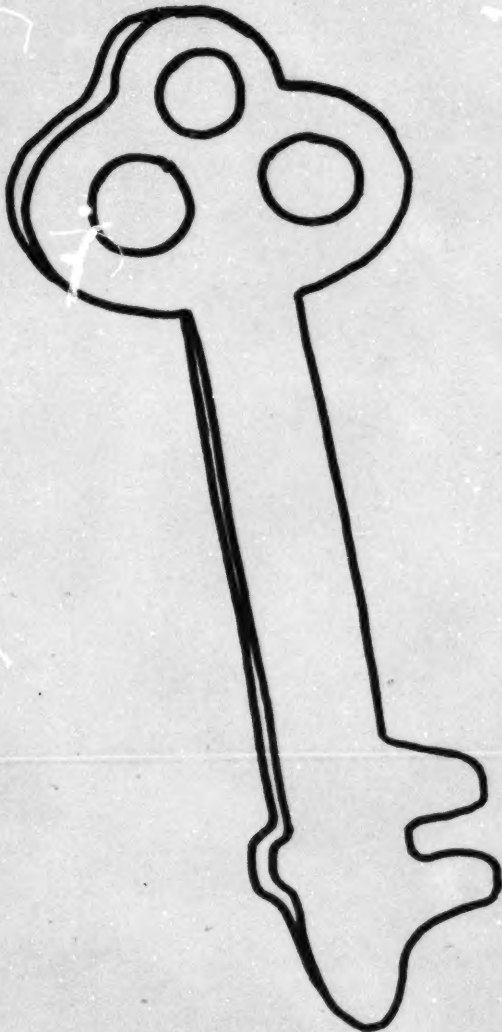
Say: "Today we will find out how much you have learned about scientists. Let's listen to the tape we made before we began the unit. Let's find out how much we know now."

CLASS ACTIVITIES

1. Listen to pre-test tape.
2. Make a new tape as a post test.
3. Free use of task cards.

SUMMARY

The children should feel free to comment on what they learned. They should also feel free to talk about things they liked or disliked about the unit.



KEY TO THE FUTURE

You need:

- pencil
- paper

Ecology careers are the key to the future of the U. S. In looking ahead to these jobs what basic skills might be needed?

Consider the following list of skills and how they will apply to ecology careers.

drawing	physical strength
reading	writing
speaking	inventing
building	imagination
testing	mathematics
designing	problem solving
exploring	researching

Make a report to the class on 3 careers in ecology. Include the skills necessary to perform the job. Can you tell the training needed for the careers in ecology?

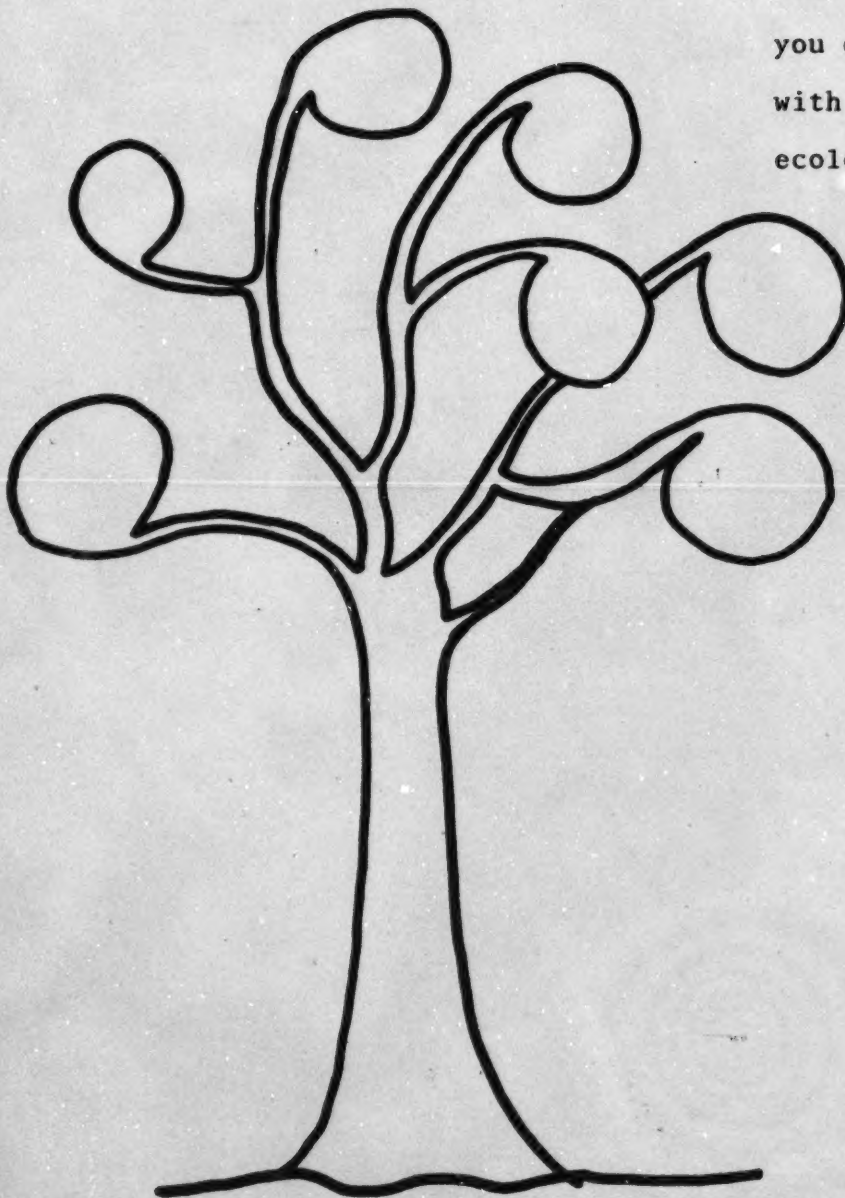
Example: refuse worker - physical strength, mechanical

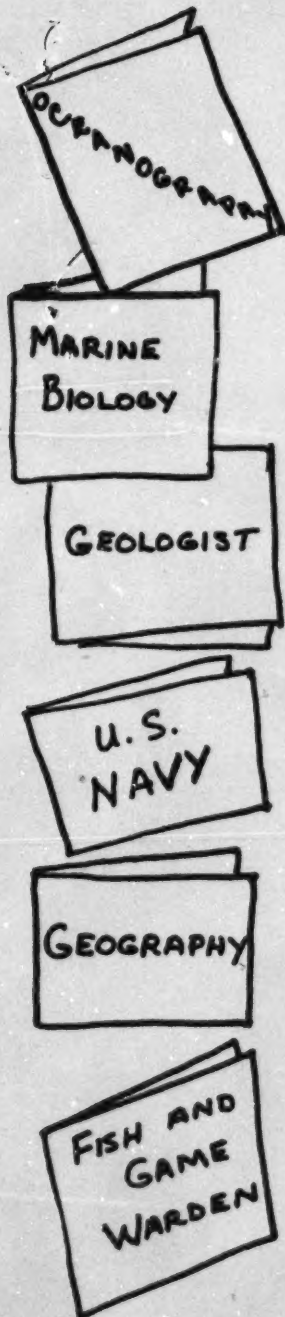
ECOLOGY WORKER TREE

You need:

- paper
- pencil

Make as many branches as
you can and fill them in
with the various types of
ecology workers.





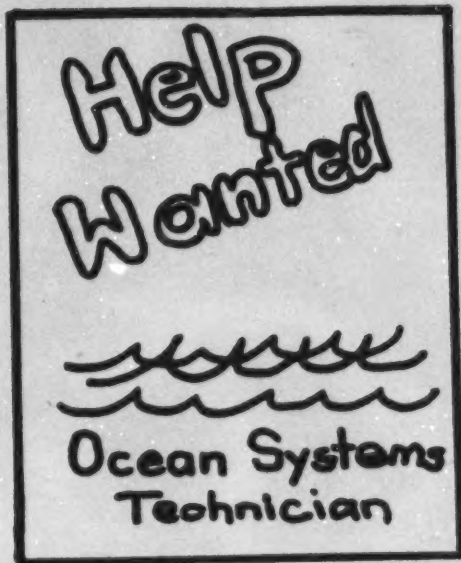
LIBRARY OF CAREERS

You need:

- encyclopedia
- paper
- pencil

There are many careers in ecology. Select one and research it. Write a report. In your report include job description, skills needed and opportunities.

1. What is done in this job?
2. What skills are needed by workers in this job?
3. What school subjects are important for this job?



You need:

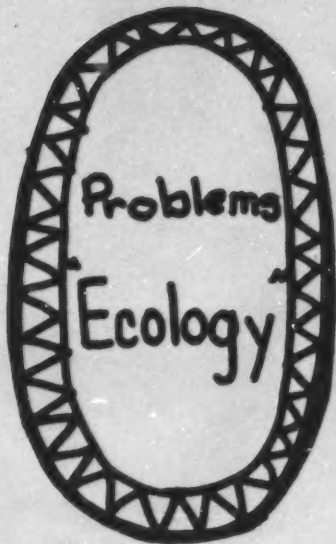
- paper
- pencil
- crayons

In the study of the ocean, complicated equipment is used. Trained personnel are needed to run the machines. These people also keep records, and make special tests of the ocean.

See if you can find some information about this job in your school or public library.

Draw this person at work.

TASK CARD 5



You need:

- newspaper
- manila paper
- glue

Look through the newspaper and find articles on ecology, such as environmental protection, animals, energy, pollution, agriculture, citizen action groups.

Paste them on a piece of manila paper. Display your poster on a bulletin board.

TASK CARD 6



You need:

- encyclopedia
- paper
- pencil

The world needs willing workers to clean it up. Pick an area of interest and list as many workers as you can who have something to do with that area.

Suggested areas of interest:

1. Pollution
2. Environment
3. Ecology
4. Water Shed
5. Wild Life Conservation
6. Soil Erosion
7. Doctors and Health Care
8. Automobile Engineers
9. Civil Engineers
10. Transportation

TASK CARD 7

RESEARCH



You need:

- encyclopedia
- pencil
- paper

1. Use an encyclopedia or library book to look up a field of ecology.

Suggested fields of ecology:

The Endangered Animals

Relocation of Animals

Fish Hatchery

Wilderness Areas for Wildlife

2. Find and list as many jobs as you can that have anything to do with your field of ecology.

WHAT'S MY LINE?

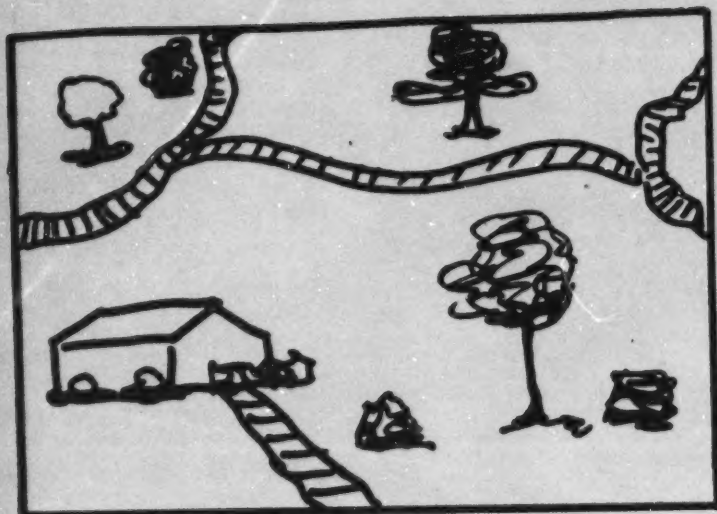


You need:

- magazines
- manila paper
- scissors
- paste

Look through some magazines. Find pictures of ecology workers at work. How are they helping the community? Make a scrapbook. Call your scrapbook, Ecology Workers on the Job.

TASK CARD 9



Plan

COMMUNITY PLANNING

You need:

- 12 x 18 manila paper
- crayons
- newspapers
- magazines

Pretend that you are an environmental architect. Plan a community that will be attractive, safe and clean.

1. Where will be your source of clean water?
2. Will you have an industry zone?
3. How will you keep out pollution?
4. Will you have green parks?

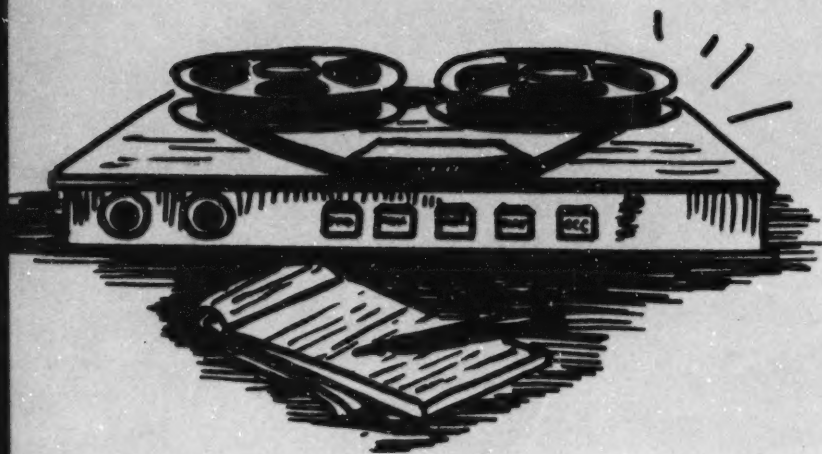
Look through newspapers and magazines for ideas. Draw a picture of your plan.

TASK CARD 10

NEWS REPORTER

You need:

- paper
- pencil
- tape recorder
- newspaper



Write a T.V. report on the needs for water conservation.

Tell the people how water and its future effects our daily lives. Tell about the people who work in this area.

Look through the newspaper for articles about water conservation. You may want to use some of the information gained to write your news report.

Tape your report and share your news release with the class.

TASK CARD 11

INSPECTOR YOU!!!

You need:

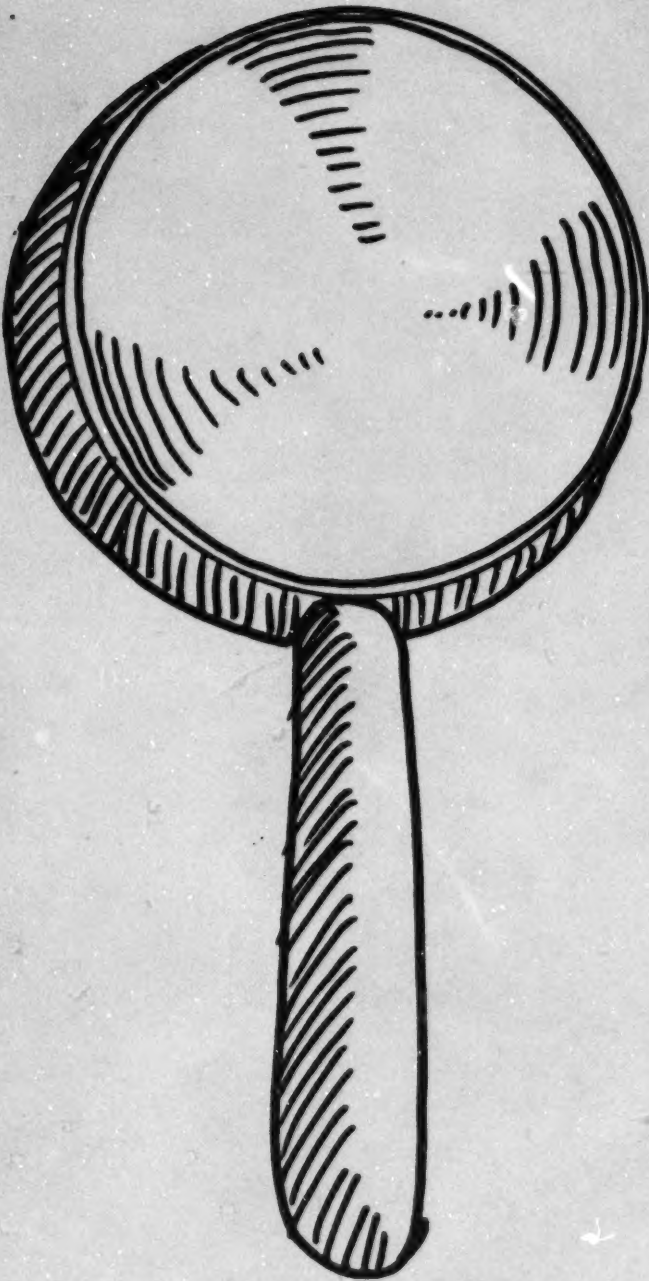
- an encyclopedia
- paper
- pencil
- idea

You are an Environmental Inspector. Your first job is to check the purity of the water supply for your community.

Make a list of tools, equipment and describe how you would check the purity of the water. Draw a picture of yourself at work.

List the skills you might need.

You may want to check the water areas at school for waste. Report your findings to the custodian.



TASK CARD 12

OUR GROWING WORLD

RUNNING OUT OF WATER

You need:

- paper
- pencil



It rains the same amount each year -- but does our population stay the same?

The population in the US has changed as follows:

1950	+150,000,000
1970	204,000,000
1980	237,000,000 (projected population)

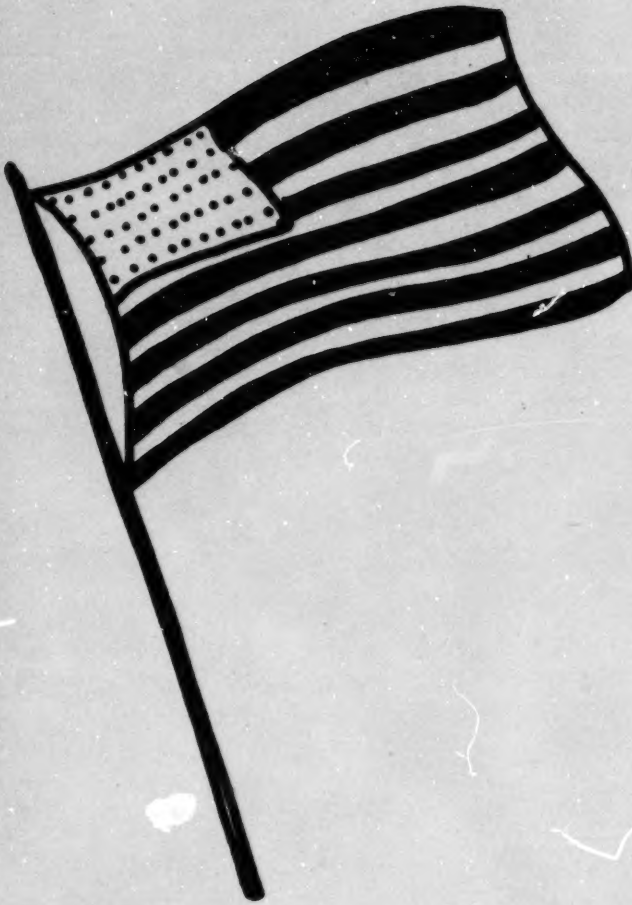
Problem: Increase in population means a decrease in water per person. List areas in which increased population means an increase in water use. How will the problem be solved? It's up to you! Write down your ideas for saving water - we need your help!

Illustrate and present to the class, your idea.

THE PRESIDENT'S TASK FORCE

You need:

- pencil
- paper
- school envelopes
- stamps



The president of the United States has designated quality of water as one of the top priority goals of the 70's.

Write a letter to the Environmental Protection Agency, Office of Water Programs, Washington, D.C. 20460.

Find out what Washington says about careers in water. In your letter include classroom ideas for 'cleaning up water'. Ask questions about jobs.

Read your letter to the class before mailing.



TASK CARD 14

WATER, WATER EVERYWHERE

You need:

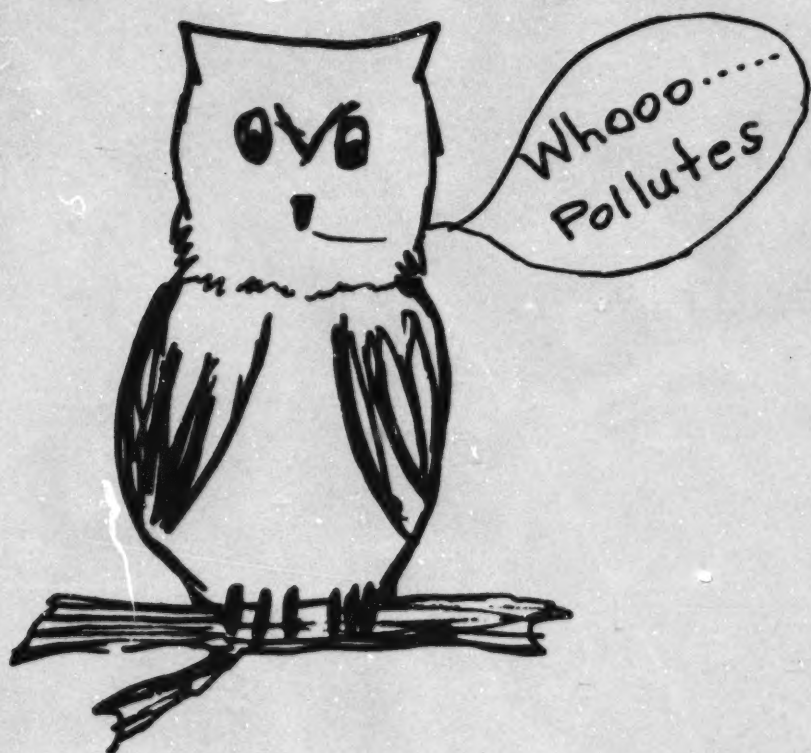
- chart paper
- pencil
- crayons or paints

Form a committee to illustrate the importance of water in our daily lives.

Suggested committees:

- Personal Use
- Farming
- Cleanliness & Health
- Industry
- Recreation

Prepare a mural for class showing importance of water.



WATER POLLUTION?????

You need:

- magazines
- scissors
- paste
- manila paper
- construction paper

Find two or three magazines, find pictures of water pollution at work. Can you find it in the home, city, county, ocean?

Present your pictures to the class. Lead a discussion on the many ways our water is being polluted.

Create a poster to illustrate your ideas. Paste the picture on a piece of construction paper. Display your work for other children to enjoy.

TASK CARD 16



You need:

- courage
- pencil
- paper

United States government has asked you to perform an important job. The automobile factories are making too much noise. We must make them quiet. That is why you, the all-American acoustical engineer, have been asked to muffle - dampen the noise. Your job, if you decide to accept it, is to design noise abatement equipment. Good Luck!

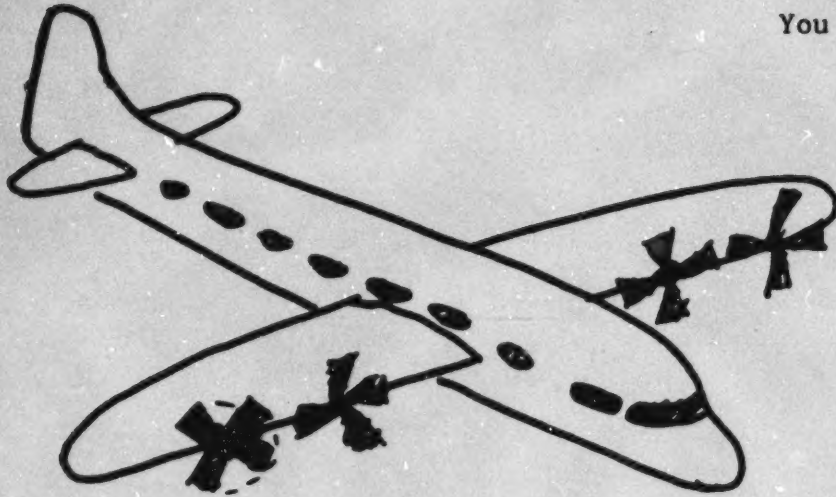
Draw some pictures and write sentences describing these pictures.

TASK CARD 17

BE AN AERONAUTICAL ENGINEER!!

You need:

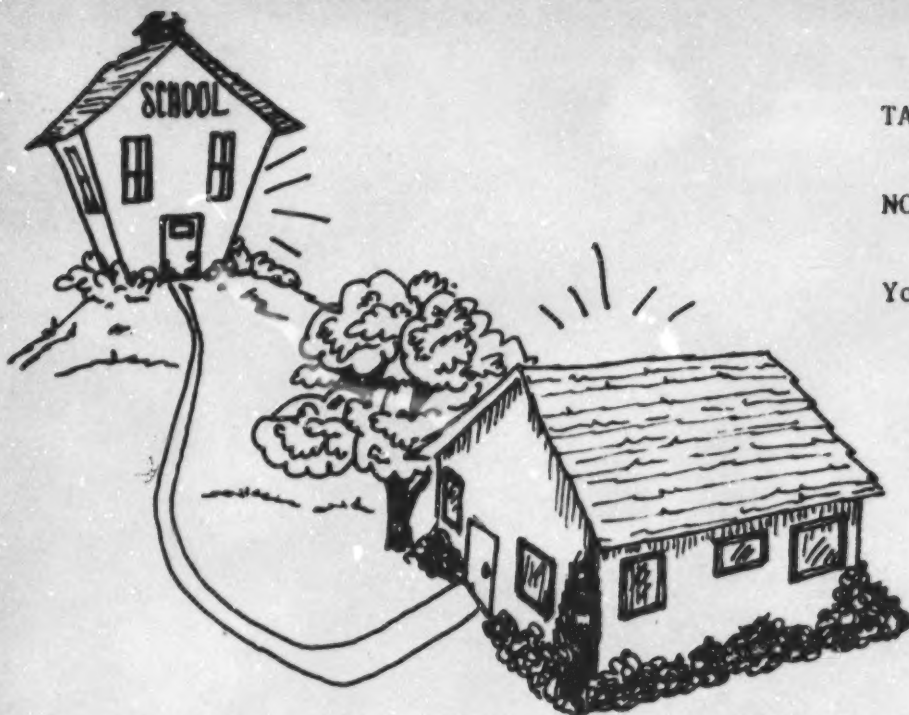
- pencil
- crayons
- paper



Jet planes landing and taking off give off noise at 140 decibels and more (noises over 140 decibels cause pain.)

Your job is to design an airplane that is as quiet as a mouse.

Draw a picture of the airplane you have designed.



TASK CARD 18

NOISE - HOME AND SCHOOL

You need:

- paper
- pencil

Think about noise at school and at home. What causes it? How could it be made quieter?

Write a report about your home or your school and the noise problem. Tell of your solution.

Share with your classmates. They may have some ideas to add to your list.



TASK CARD 19

SOUND IS MEASURED IN DECIBELS!!

You need:

- paper, manila
- pencil
- crayons

Permissible Noise Exposures

Duration per day in hours	Sound level (decibels)
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼	115

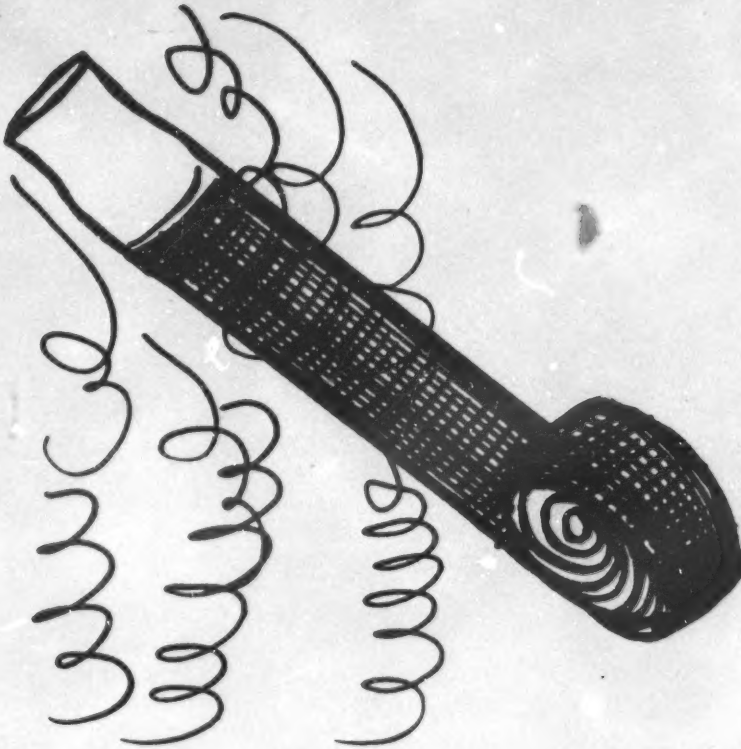
The workers in your factory spend 6 hours a day exposed to 95 and 97 decibels. What can you do to make or design equipment for their protection? Describe what you would do, make an illustration of it. Write a story about your factory. What does it make? How do you protect the workers? Who could you hire to help reduce the noise?

TASK CARD 20

FIND THE NOISE MAKERS

You need:

- magazines
- manila paper
- scissors



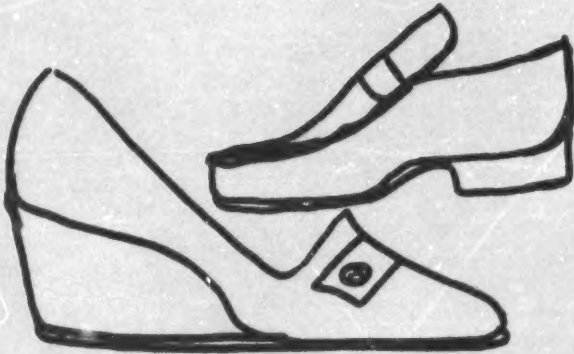
Look through a magazine and find all the noise makers. How many can you find? Go one step further and divide them into two groups: quiet noise and noisy noise. Find as many as you can.

TASK CARD 21

MAYOR FOR THE DAY

You need:

- paper
- pencil
- tape recorder
- 2 or 3 friends with acting skills



Mr. or Mrs. Shoemaker would like to build a new shoe factory in your community. It would mean hundreds of jobs for all kinds of workers. They have selected a location - right next door to the junior high school. The board of education fears that the noise level would be too high for students in a learning situation. You are having a meeting with the Shoemakers and City Council to try to solve the conflict. Act it out. Record your discussion and decision-making and share with the class.

TASK CARD 22

MARTY THE MAGICIAN

You need:

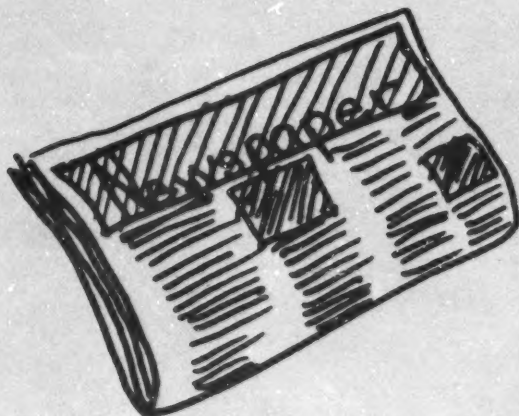
- pencil
- paper
- crayons
- ideas
- shoebox



You are designing a new community. You want to use plants to help keep the noise down. Plan your community in a shoe box diorama. Display your work in your classroom. Can you explain why plants help keep the noise level down?

TASK CARD 23

EXTRA! EXTRA! EXTRA!



You need:

- lined paper
- pencil
- manila paper

You are an editor of a local newspaper and are writing a story on the importance of protecting our wildlife.

Write an editorial letter on the importance of ecology and nature. Share the letter with the class.

Have a parent volunteer to type your letter and run it off on the ditto machine to be distributed to classmates and parents.



You need:

- 2 to 4 willing actors
- paper
- pencils

The Senate Committee on Wildlife Protection is in session. You are a member of this committee. What laws, ideas will your committee suggest for advancement in these areas?

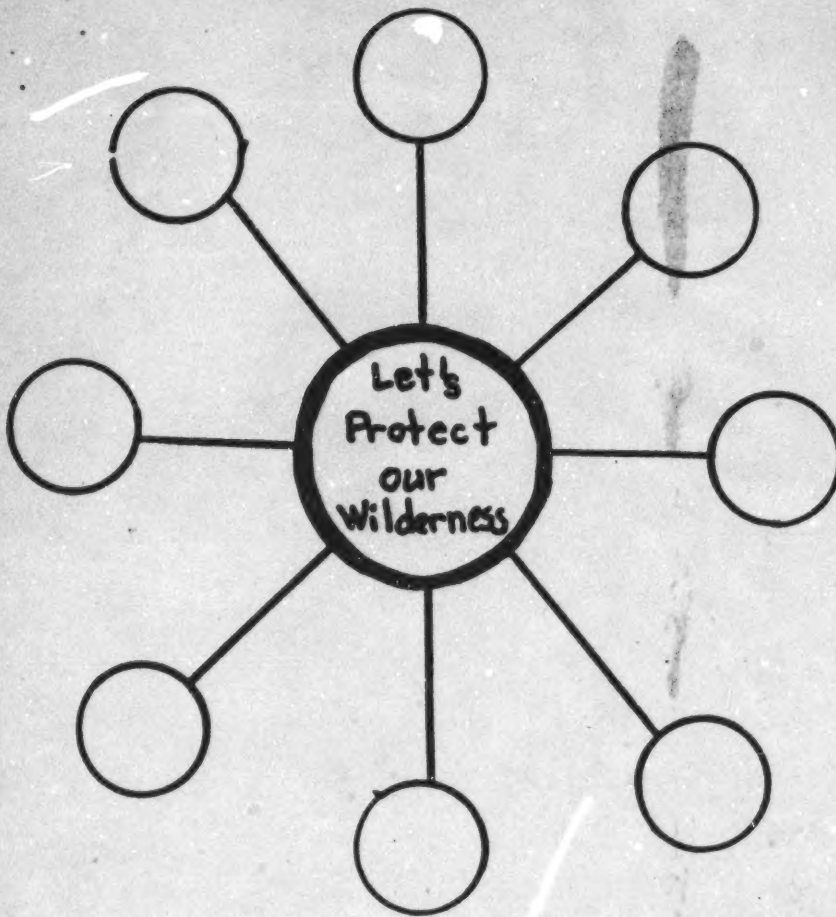
Record your ideas and present as a discussion panel for the class.

TASK CARD 25

MAKE YOUR OWN JOB
WHEEL

You need:

- manila paper
- pencil
- paper
- 1 or 2 good thinkers



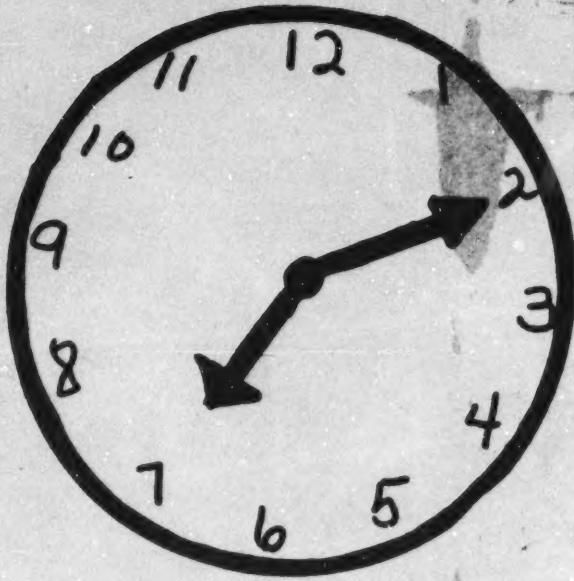
Make a worker wheel showing the different occupations needed to protect our wilderness.

Make a report to the class. See if they have other ideas to add to the worker wheel.

TIME MACHINE

You need:

- manila paper
- pencil
- lined paper



Set your time machine and imagination for 100 years from now.

What will it be like 100 years from now? How will our wildlife survive? What will our parks and recreation areas look like?

Describe your ideas in a story or a poster. Be prepared to share this with the class.

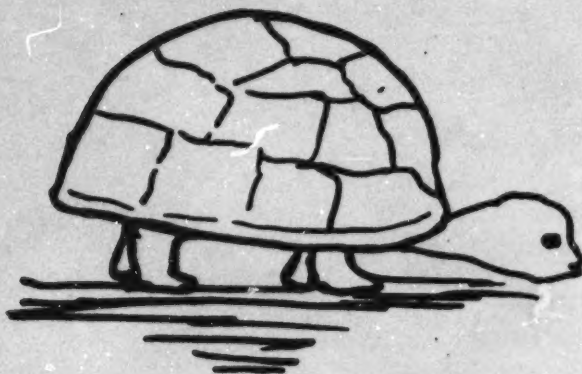


You need:

- pencils
- paper
- manila paper

Forest firefighters are essential to protecting what's left of our wilderness. List the skills necessary for this job. Make a poster advertising for a career in this area.

Make a report to the class. Tell them of the necessary skills and training to do the job. You may want to read about firefighters first. Ask your librarian to help you.



DESERT TORTOISES

You need:

- paper
- pencil
- manila paper

Many animals become endangered as people move further into the desert area. One such animal needing help is the desert tortoise. You are the area naturalist. What can you do to help relocate the tortoise? How can you keep track of the tortoises (beepers, tags, etc.)?

Write a story of your project and your successful relocation of the tortoises. Illustrate your report with a picture of your work and share with the class.

What other animals may need relocation and why? Expand your program and share with the class.



TASK CARD 29

USE IT AGAIN, SAM!!

You need:

- magazines or newspapers
- glue
- scissors
- manila paper

Conserving resources is a major ecological problem. One way of conserving resources is to recycle (use it again). Look through magazines, newspapers cutting out pictures of goods which can be recycled. Make a collage or scrapbook with your pictures. Share with the class.



TASK CARD 30

TIDE POOL POACHERS

You need:

- papers
- pencil
- manila paper
- encyclopedia

Tide pools are rocky pockets along the coast of California that trap water as the tide goes out. These pools provide homes for many species of seaweeds, barnacles, worms, snails, clams, mussels, octopi, crabs, starfish, shrimp - the list is endless.

You are a game warden concerned with the number of school groups who visit the pools collecting specimens, which is against the law. You may observe the tide pool life but not remove it from its location.

Prepare a report and poster containing ideas and solutions to the problems of disappearing sea life in the tide pools.

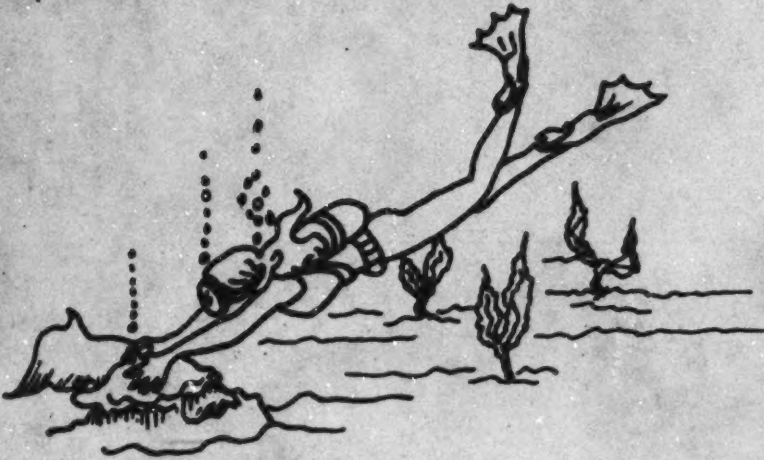
Present your report to the class.

TASK CARD 31

UNDERWATER ECOLOGY PATROL

You need:

- manila paper
- crayons



The California coast is often used for a dumping area for trash. Skin divers have formed a club to use their diving skills to clean up the litter under our water. You have been elected president of the club.

Draw a picture showing what the underwater area looked like when you first saw it, littered. Then draw a second picture to show how it looked after you and your diving club cleaned up the area.

CLEANING OUR BEACHES

You need:

- manila paper
- crayons



The beaches of California are areas of pleasure, recreation and wild-life. Some of our beaches become full of trash and broken glass.

Draw a picture showing what the beaches looked like when citizens were not aware of ecology controls. Then draw a second picture to show what the beach would look like when citizens are informed and care and start doing things to clean up the beaches.



TASK CARD 33

You need:

- 2 or 3 willing persons to serve on a panel
- paper
- pencils
- tape recorder, tape

We need more energy. Drilling for oil may provide more energy. It may also provide more jobs for people.

. . . . But, drilling off the coast of California has resulted in accidents that have hurt the ecology, including many shore and ocean animals.

Organize a panel and prepare a debate about the pros and cons of off-shore oil drilling.